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XXXI.—*Note on a New and Primitive Type of Compound Ascidian.* By WALTER GARSTANG, M.A., Berkeley Fellow of the Owens College, Manchester.

DURING some dredging-operations in the neighbourhood of Plymouth, which I have recently been enabled to carry on by means of a Government grant given me by the Royal Society Committee, I met with specimens of a new and interesting Compound Ascidian, which forms the subject of the present note.

The specimens of this Ascidian were found in moderately shallow water (5 to 15 fathoms) attached to stones and shells, upon which they formed small inconspicuous incrusting colonies, freely coated with sand-grains. The colonies possess a thin, spreading, carpet-like base of test-substance, traversed by stolonial tubes, from which zooids spring up at irregular intervals. Sometimes the zooids are entirely free, but usually they are united into small clumps consisting of several individuals, the tests of which are partially fused together. The zooids project from the basal carpet of test to a variable extent: their height, as a rule, is between 6 and 10 millim. They possess a dilated and somewhat globular thoracic region and an elongated semicylindrical abdominal region, which is always more slender than the thoracic portion. The zooids bear two distinct apertures, the oral and cloacal openings, of which the former is the larger. Each aperture is bounded

by six well-marked lobes of triangular or semicircular shape. In the larger groups of zooids there is a distinct tendency to an arrangement of the individuals in such a way that the cloacal apertures are situated towards the centre of each clump, the oral apertures towards the periphery.

The test for the most part is covered with sand-grains, whereby the colonies are rendered highly inconspicuous. The adhesion of sand-grains is of interest in considering the process by which the clumps are formed. In the majority of the clumps examined, the sand-grains form a complete sheath around each zooid; they not only adhere to the test of the zooids upon their external faces, but they also separate the individual zooids of a clump from one another. The existence of foreign particles between the zooids of the clumps shows clearly that these have been formed by a process of fusion or conrescence.

In general structure the ascidiozooids agree with those of the majority of the Distomidæ. The body, when removed from the test, is seen to be divided into two regions, the thorax and abdomen, which are connected by a slender œsophageal stalk. A mature zooid is from 3 to 4 millim. in length. The musculature is well developed. In the thoracic region it consists of both longitudinal and transverse fibres united into bundles that form a strong square-meshed lattice-work; the longitudinal bundles appear to be arranged in six main groups, corresponding to the number of the oral lobes. In the œsophageal and abdominal regions longitudinal bundles are present, but transverse muscles are altogether absent. The ganglion is large and spherical, and the subneural gland is well developed. The buccal tentacles are about thirty in number. The pharynx possesses three rows of straight and elongated stigmata, and two moderately broad horizontal membranes with perfectly straight edges.

In young zooids I have been unable to discover any trace of oviduct or vas deferens; but in mature zooids both are present. The ova are large, and undergo their development in the atrial cavity. There is no special oviducal or cloacal diverticulum for their reception.

The characters of this Ascidian necessitate the definition of a new genus and species of the family Distomidæ:—

ARCHIDISTOMA, gen. nov.

Colonies incrusting; consisting of a spreading basal portion from which arise zooids at irregular intervals. Zooids either entirely free or partially fused together to form clump-like aggregations. Oral and cloacal apertures distinct, six-lobed.

Musculature in the thoracic region consisting of both longitudinal and transverse bundles. Oviduct and vas deferens present in mature zooids. No incubatory diverticulum of the cloaca.

Fig. 1.



Archidistoma aggregatum.—A small colony, enlarged.

Fig. 2.



Archidistoma aggregatum.—Part of another colony, enlarged, showing the partial freedom of the zooids of a clump, and the tendency of the cloacal openings towards a central position.

Archidistoma aggregatum, sp. nov.

Clumps composed of a small but variable number of zooids. Test arenaceous. Tentacles about thirty in number. Pharynx possessing three rows of straight elongated stigmata; horizontal membranes between the rows of stigmata; no intermediate supporting membranes. Ova large, containing much food-yolk.

Archidistoma aggregatum is a connecting-link between the true Distomidæ (*Distoma*, *Cystodites*, *Distaplia*, *Oxycorynia*,
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Colella) and the Clavelinidæ (s. str.). Hitherto no true* Distomid has been known to possess free zooids—that is, zooids not completely imbedded in a common test. This new Ascidian, however, combines the structural characters of the Distomidæ with a social form of colony which is only slightly removed from that of the Clavelinidæ.

Further, *Archidistoma aggregatum* is of especial interest because it exhibits the first stage in the evolution of the cœnobitic type of colony from the social Ascidian type, in which the zooids are entirely free and irregularly placed: in *Archidistoma aggregatum*, the clumps of zooids (primitive cœnobia) have no common cloaca, but the cloacas of the individuals are usually situated towards the centres of the groups. The second stage is exhibited in such a Compound Ascidian as *Synoicum turgens* or *Circinalium conrescens*, in which each of the isolated clumps of zooids possesses a common central cloaca.

XXXII.—*Natural History Notes from H.M. Indian Marine Survey Steamer 'Investigator,' Commander R. F. Hoskyn, R.N., commanding.*—Series II., No. 1. *On the Results of Deep-sea Dredging during the Season 1890–91.* By J. WOOD-MASON, Superintendent of the Indian Museum, and Professor of Comparative Anatomy in the Medical College of Bengal, and A. ALCOCK, M.B., Surgeon I.M.S., Surgeon-Naturalist to the Survey.

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Class ASCIDIACEA.

Family Cynthiidae.

CULEOLUS, Herdman.

1. *Culeolus* sp. prox. *recumbens*, Herdman.

Eight specimens of varying sizes from Station 110, 1997 fathoms, come very close to this species from the higher latitudes of the Southern Ocean, if they are not identical with it.

These are the only specimens of Tunicata that we have as yet obtained from the deep sea.

* The position of *Chondrostachys* is uncertain, but its nearest affinity seems to be with *Stereoclavella* rather than with *Oxycorynia*. *Diazona* is separated from the Distomidæ by the presence of internal longitudinal bars in its branchial sac.